

# Groundwater under the Western Disposal Area

- Groundwater flows to Portage Creek - not down into the lower aquifer
- Portage Creek does not discharge to groundwater at the Allied OU
- Drinking water criteria are not applicable to the creek - GSI are most appropriate
- There are few GSI exceedances in groundwater
  - None for PCBs (at applicable locations)
  - Mn, Fe and As are found naturally throughout Kalamazoo County
- There is nothing about existing site conditions that would change how the City already treats groundwater used for drinking



# ***The Water Trail***

- Wet soils and sediments removed from river and dried at Plainwell
- Dried materials transported in sealed trucks covered with tarps
- Dried materials placed in prepared cells on top of clay-rich paper residuals at Allied Paper site
- Disposal cells sloped to drain water away from sediment and soils
- Water collected and pumped to a treatment system
- Water collection and treatment system will be operated until such time (if ever) that EPA determines it is unnecessary

# Properties of Paper Residuals

- Paper residuals have physical properties that make them well suited for use as a landfill liner
- The 4 to 20-foot layer of these clayey materials in the Western Disposal Area poses a formidable barrier to the passage of water
- The National Council for Air and Stream Improvement (NCASI) at Western Michigan University has found paper sludge to be superior to standard compacted clay as hydraulic barrier material

# Groundwater data at Allied Site

- Thousands of groundwater sample testing results have been produced by monitoring Allied Paper site groundwater since the late 1980s
- Groundwater samples have been analyzed for:
  - Inorganics, in particular metals
  - Volatile organic compounds (VOCs)
  - Semivolatile organic compounds (SVOCs)
  - Pesticides
  - PCBs
- The MDEQ compared these data to the most stringent groundwater criteria.

## **Groundwater data at Allied Site (cont.)**

- Results: No VOCs, SVOCs, or pesticides at levels or locations of concern
- Results: PCBs have only been detected below levels where groundwater discharges to Portage Creek
- Results: Almost all inorganics are found at levels below levels of concern
- Results: Manganese, arsenic, and iron detected at levels exceeding drinking water standards in samples collected from several locations

# What about inorganics?

- Manganese, arsenic, and iron are naturally-occurring in groundwater, particularly in naturally hard water
  - The Kalamazoo area has extremely hard water – 84% of private wells in the City and Township of Kalamazoo exceed State drinking water standard for hardness, and 33% of private wells exceed standard for iron
- On average, these three inorganics are found at lower concentrations in the paper residuals than the native soils at the Allied Paper site
- The drinking water standards for manganese and iron are not based on impacts to health, they are based on aesthetics, such as taste and potential for staining

# What about inorganics?

- Drinking water standard for arsenic is health-based. Kalamazoo area has naturally high concentrations of arsenic in groundwater. Kalamazoo County website states:
  - “Drinking water in some areas of Kalamazoo County has levels of naturally occurring arsenic that are above the recommended health level.”
  - “Water quality problems, such as hardness, arsenic, and high iron, are caused by naturally occurring substances.”